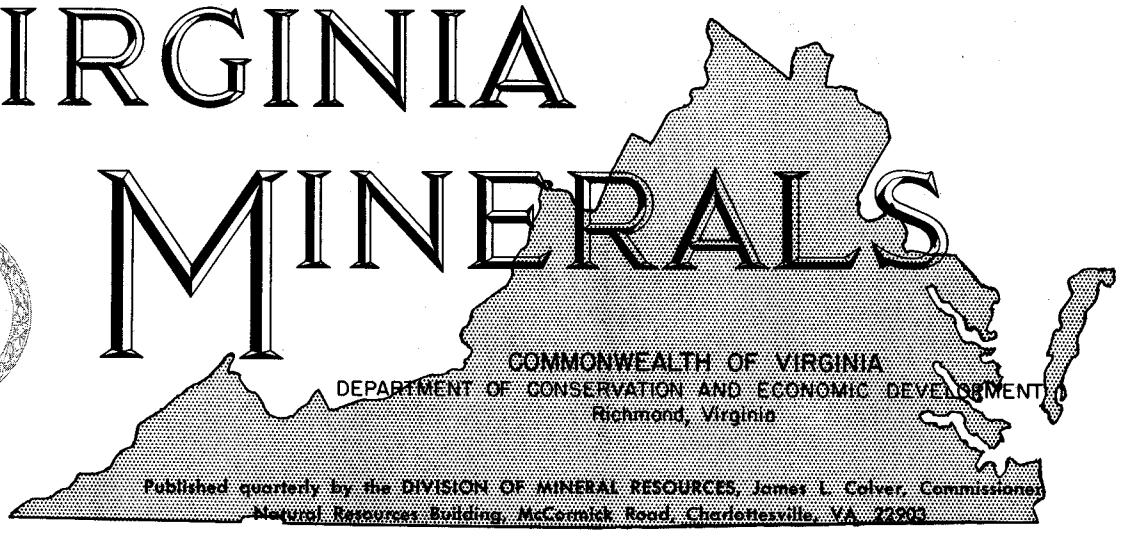
VIRGINIA MINERALS



COMMONWEALTH OF VIRGINIA
DEPARTMENT OF CONSERVATION AND ECONOMIC DEVELOPMENT
Richmond, Virginia

Published quarterly by the DIVISION OF MINERAL RESOURCES, James L. Calver, Commissioner
Natural Resources Building, McCormick Road, Charlottesville, VA. 22903

SPECIAL ISSUE OCTOBER, 1969

NATURAL FEATURES CAUSED BY A CATASTROPHIC STORM IN NELSON AND AMHERST COUNTIES, VIRGINIA

Torrential rains associated with hurricane Camille dumped up to 27 inches of water during the night of August 19-20, 1969 on portions of Nelson, Amherst, and adjoining counties, Virginia. The severe storm centered in the headwaters of the Tye and Rockfish rivers and their tributaries. Abnormal amounts of rainfall have been reported from the Clifton Forge area in the western portion of the State, eastward. Considerable rain fell on the western slope of the Blue Ridge in the South River watershed. All the above mentioned streams are in the James River basin, and the flood damage extended through Richmond, eastward.

Massive landslides of the debris-avalanche type moved soil, boulders, and trees to create chutes and channels that extend from the foot of the steep mountainous slopes to the mountain crests. The slides were most numerous on mountainsides underlain by the Lovingston Formation, a biotite granite gneiss of Precambrian age. Alluvial, rubble, and debris fans were formed, and extreme high water occurred in the lower reaches of the valleys to cause extensive property damage and loss of life. The erosional and depositional features are similar to those formed in 1949 during a severe storm with rainfall exceeding 9 inches that centered in the mountainous headwaters of the North Fork and South Fork of Little River, Augusta County, Virginia. There the chutes and channelways were developed largely on the sandstones and shales of the Hampshire Formation, Devonian age. After studying the 1949 storm damage and that of a 1955 storm in northeastern Pennsylvania, Dr. John T. Hack, U. S. Geological Survey, concluded that severe rainstorms are recurring phenomena and are an important factor in the erosion and formation of the central Appalachian mountain landscape.

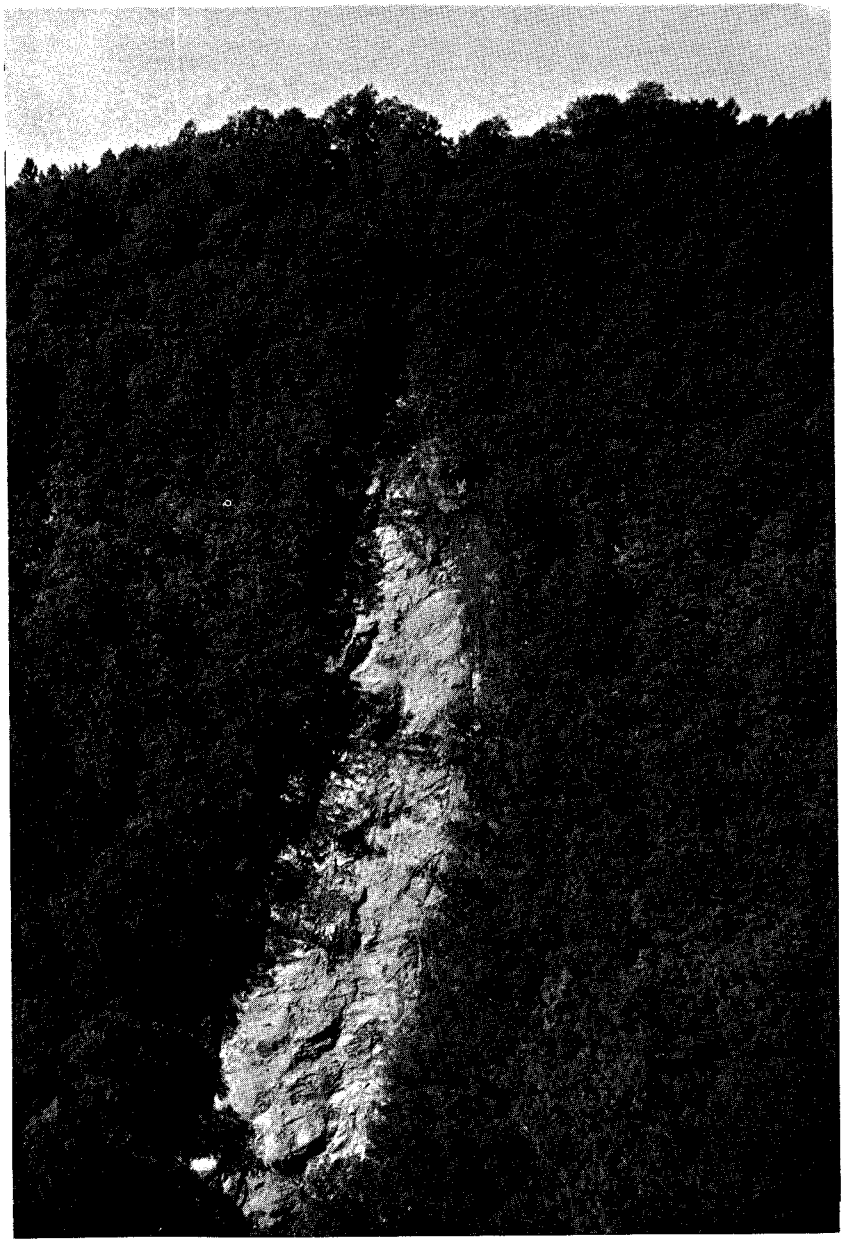
The State Geologist received authorization from the Office of Civil Defense to inspect the flood-damaged area. The photographs appearing in this article were taken by staff members of the Virginia Division of Mineral Resources, Thomas M. Gathright and Donald W. Hutcheson, who accompanied Dr. James L. Calver on the inspection trip, August 28, 1969.

References:

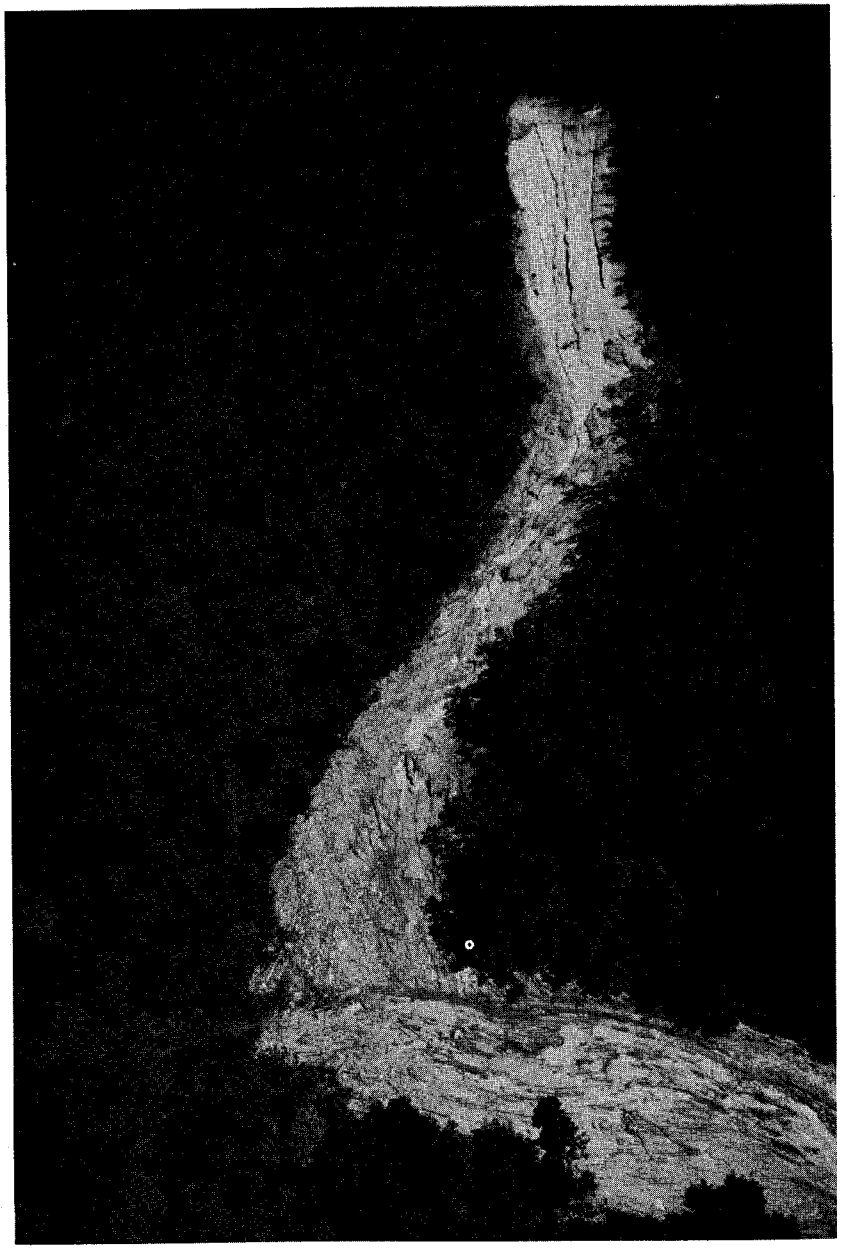
Hack, J. T., 1956, Erosion by catastrophic floods in the Ridge and Valley province, Virginia (abs.): Virginia Jour. Sci., vol. 7, no. 4.

Hack, J. T., and Goodlett, J. C., 1960, Geomorphology and forest ecology of a mountain region in the central Appalachians: U. S. Geol. Survey Prof. Paper 347.

U. S. Geological Survey, 1969, Streamflow and groundwater conditions: Water Resources Rev., Aug. 1969.



1 Upper portion of typical chute where bedrock of the Lovingston gneiss (Precambrian age) has been laid bare. West slope of Pats Knob below Shields Gap, about 5 miles northeast of Roseland.



2 Chute with multiple gullies eroded into weathered bedrock of the Erwin sandstone of Cambrian age. On west side of Blue Ridge about 4.5 miles south of Fairfield, Rockbridge County.

3 Rubble-strewn slopes and partially braided streams in the foothills of Woods Mountain. Shaeffer Hollow, about 2.5 miles northeast of Roseland.

4 Numerous chutes from which debris was disgorged onto valley fills; streams, were subsequently entrenched. Head of Fortunes Cove south of High Top Mountain (left center), about 2 miles northwest of Lovingston.

5 Accumulation of coarse boulders, tree trunks, and soil near the base of a steep chute. Just northeast of Pats Knob (background), about 5 miles northeast of Roseland.

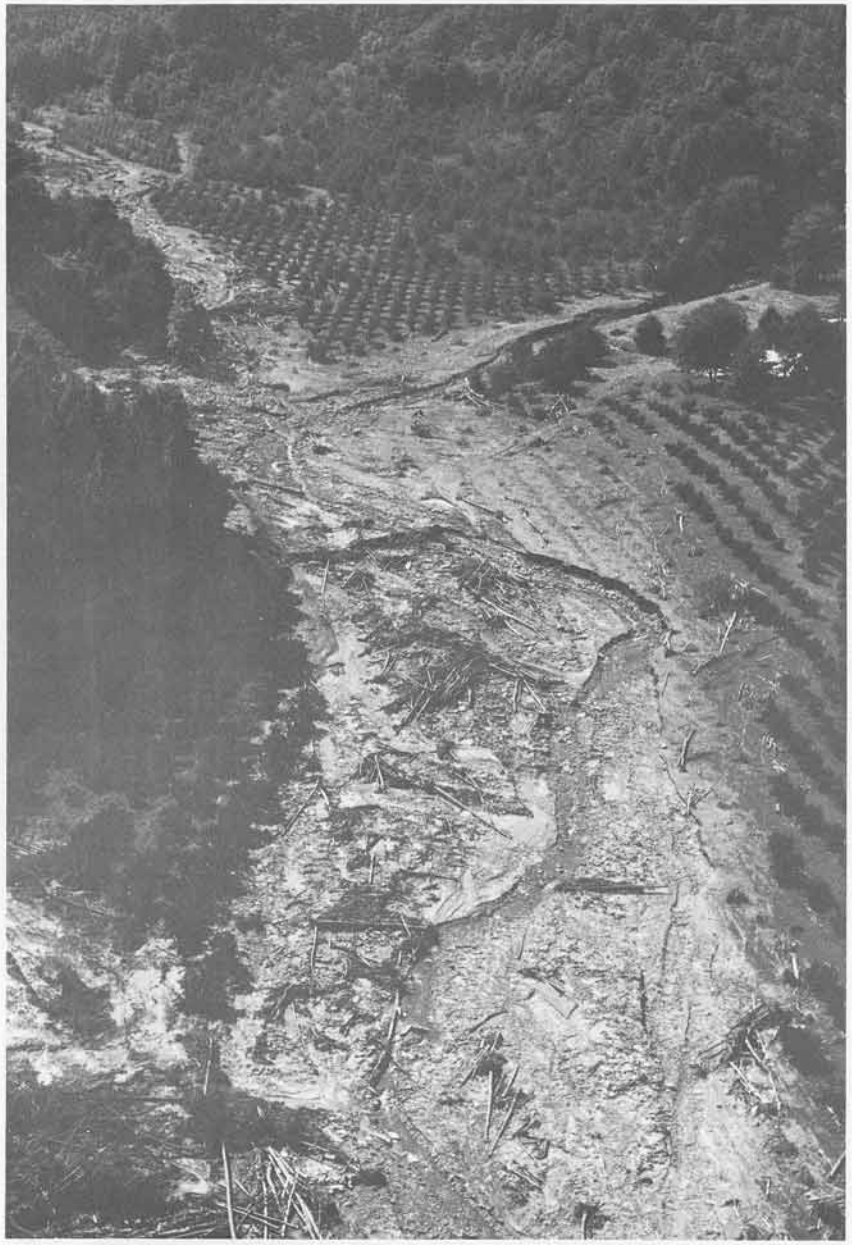
6 Torrentially deposited gravels and tree trunks in valley bottom along toe of pre-existing colluvial fan (left center). Note scarps along banks of streams. Wills Cove (center), just southwest of Fortunes Cove, about 2 miles west-northwest of Lovingston.

7 Stream meandering through rubble field derived from material contributed by chutes occurring along flanks of valley. Coarse boulders (lower right) were discharged from such a chute. Looking downstream along Davis Creek, about 3.5 miles southwest of Woods Mill.

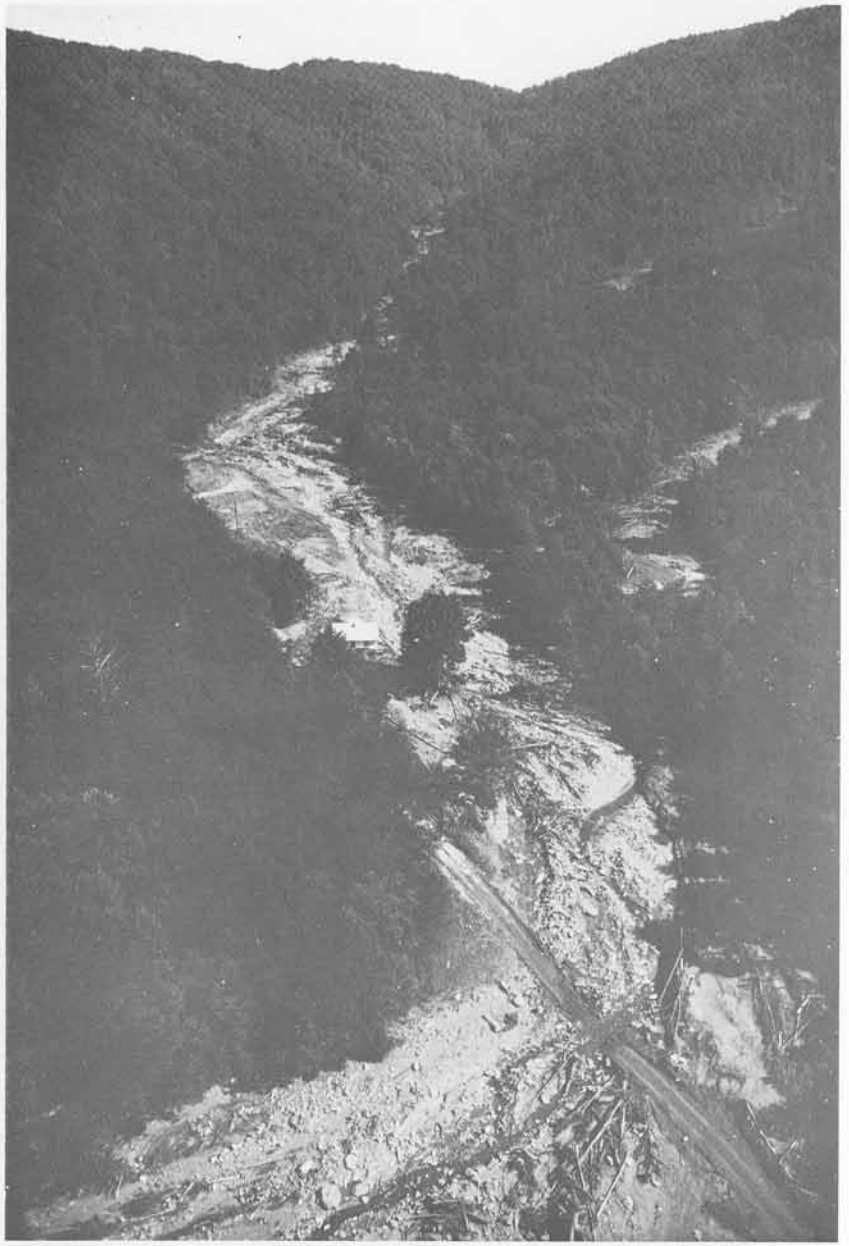
8 Erosion of soil to bedrock in denuded ravines and subsequent discharge of rubble to stream below; note large boulders adjacent to and in stream bed (foreground). North Prong of Davis Creek, about 4.5 miles south-southwest of Woods Mill.

9 Chutes and incised stream channels; natural piling up of tree trunks and boulders occurred where the gradient of the slope was less steep. East Branch of Hat Creek, south of Shaeffer Hollow, about 2 miles northeast of Roseland.

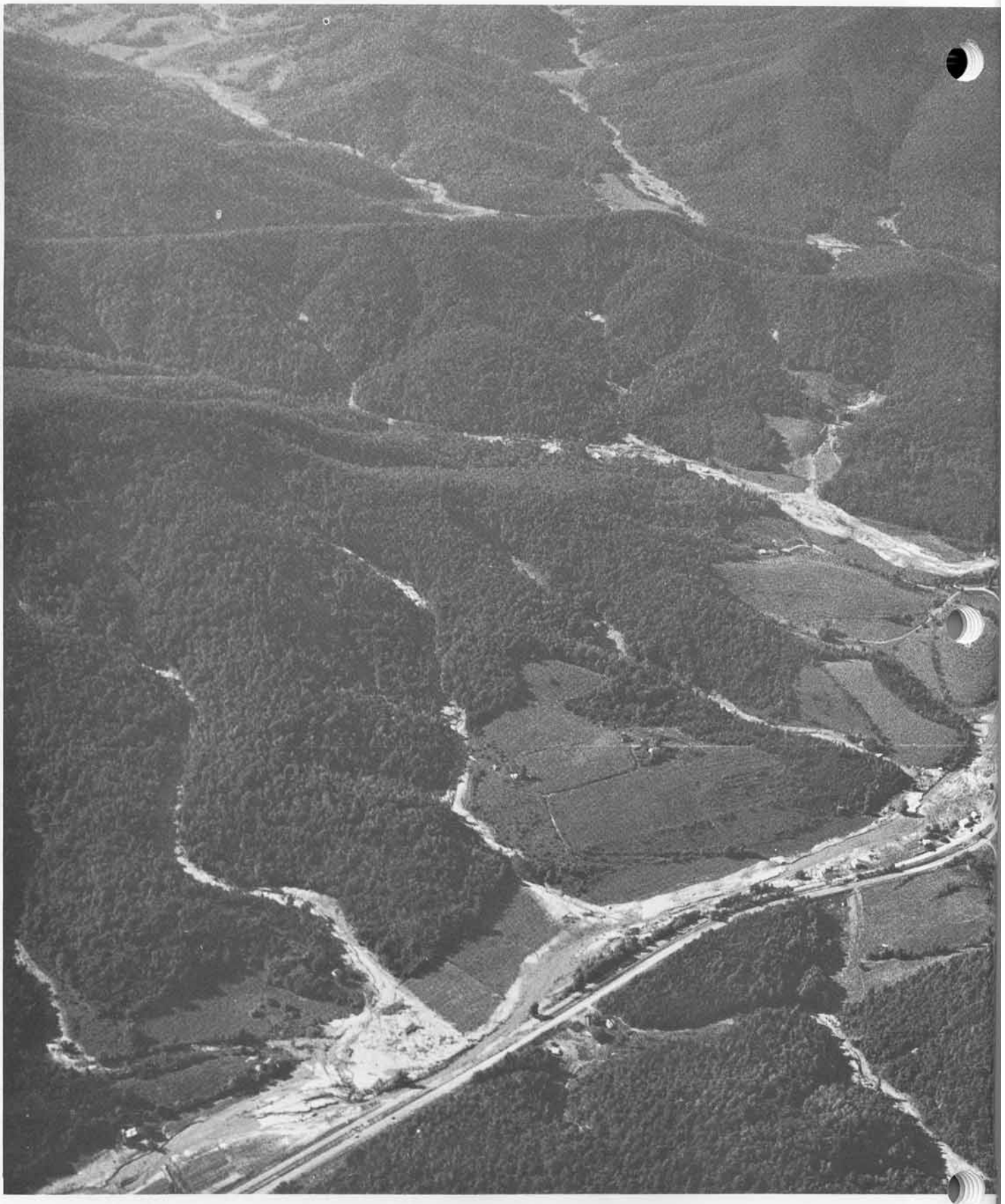
10 Channel development on slip-off slope of Tye River. Natural levees (foreground) are eroded by small rivulets, and a mud-flow has been discharged from a cone-shaped depression (lower left). About 1.5 miles due south of Roseland along Tye River.



11 Newly incised channel on pre-existing alluvial material that is partially covered by chaotically deposited rubble from the headwaters of the North Prong of Davis Creek. About 4.5 miles south-southwest of Woods Mill.



12 Jumble of boulders and tree trunks deposited during debris-avalanche. Edes Hollow, about 1.5 miles north-northeast of Lovingston.



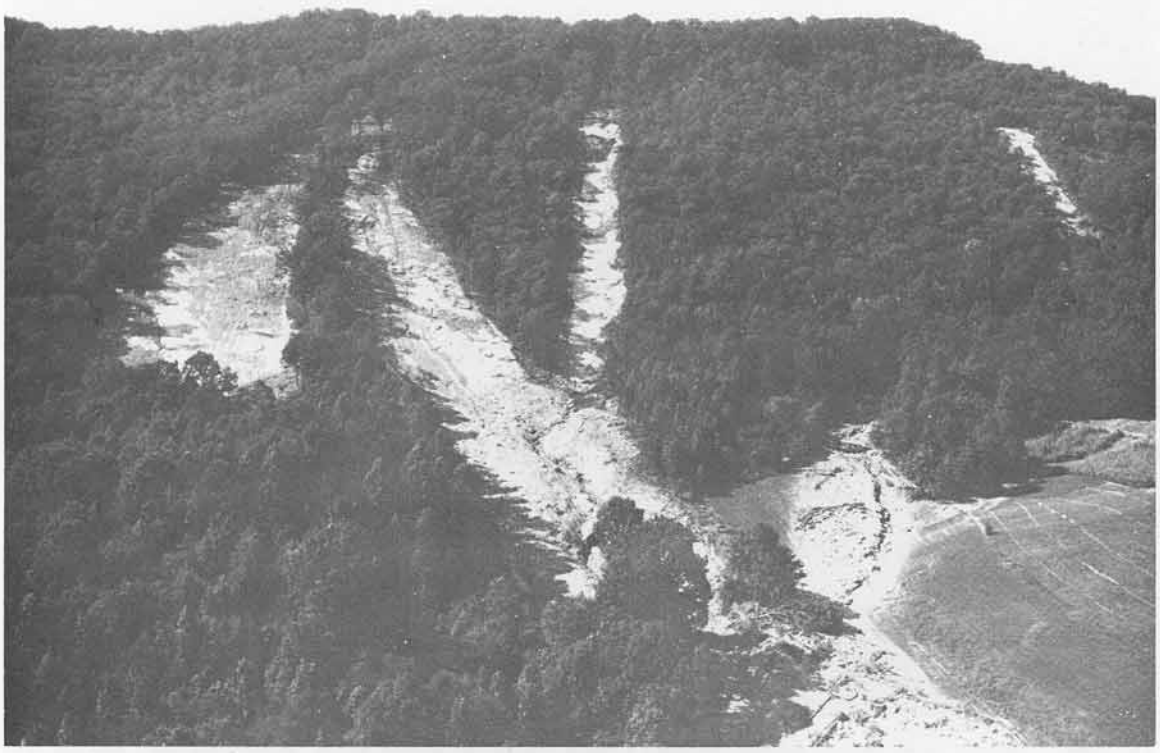
13 Catastrophic headward erosion of ravines with development of chutes and accumulation of rubble and debris con
(extreme left) and Roberts Mountain (upper right);

and veneers in some valleys. Valleys of Muddy Creek (foreground) and Davis Creek (background); Woods Mountain
d Myndus (center right) adjacent to U. S. Highway 29.

14 Debris cone containing boulders and tree trunks at base of east slope of Woods Mountain; Muddy Creek at toe of cone. About 5.8 miles north of Lovingston.

15 Stream channel incised into a newly formed flood plain; two scarps have been cut into the terrace on the right bank. Boulders and gravels that were chaotically deposited are flanked by finer grained sediments of the flood plain. Along Davis Creek looking northeastward to Mt. Zion Church, about 1.5 miles southwest of Woods Mill.

16 Confluence of tributary with Davis Creek where debris trains were deposited along watercourses. Dendritic pattern has developed in an irregular-shaped chute above channel (center background). Looking southeast along North Prong (foreground) to its junction with Davis Creek (midground), about 3.2 miles southwest of Woods Mill. The junction of State Roads 623 and 625 was obliterated.

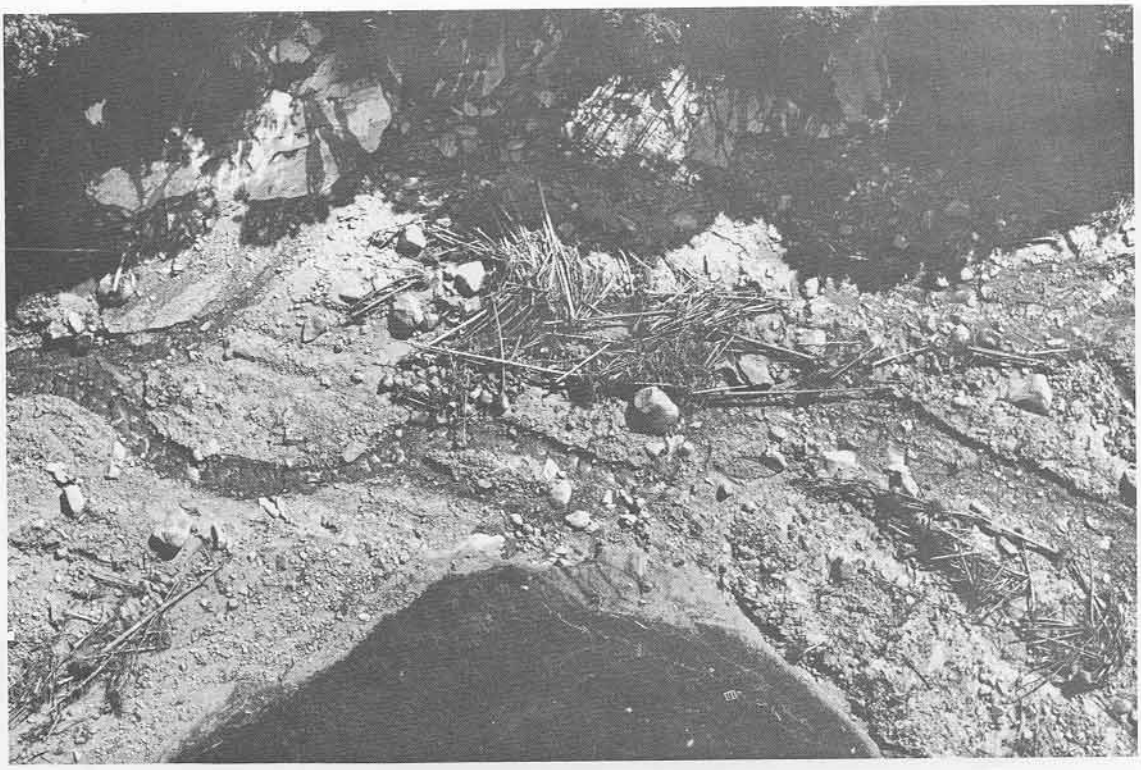


17 Coalescing chutes on ridge slope with rubble accumulation at base of scars. Along southeast face of ridge about 0.5 mile west of Myndus.

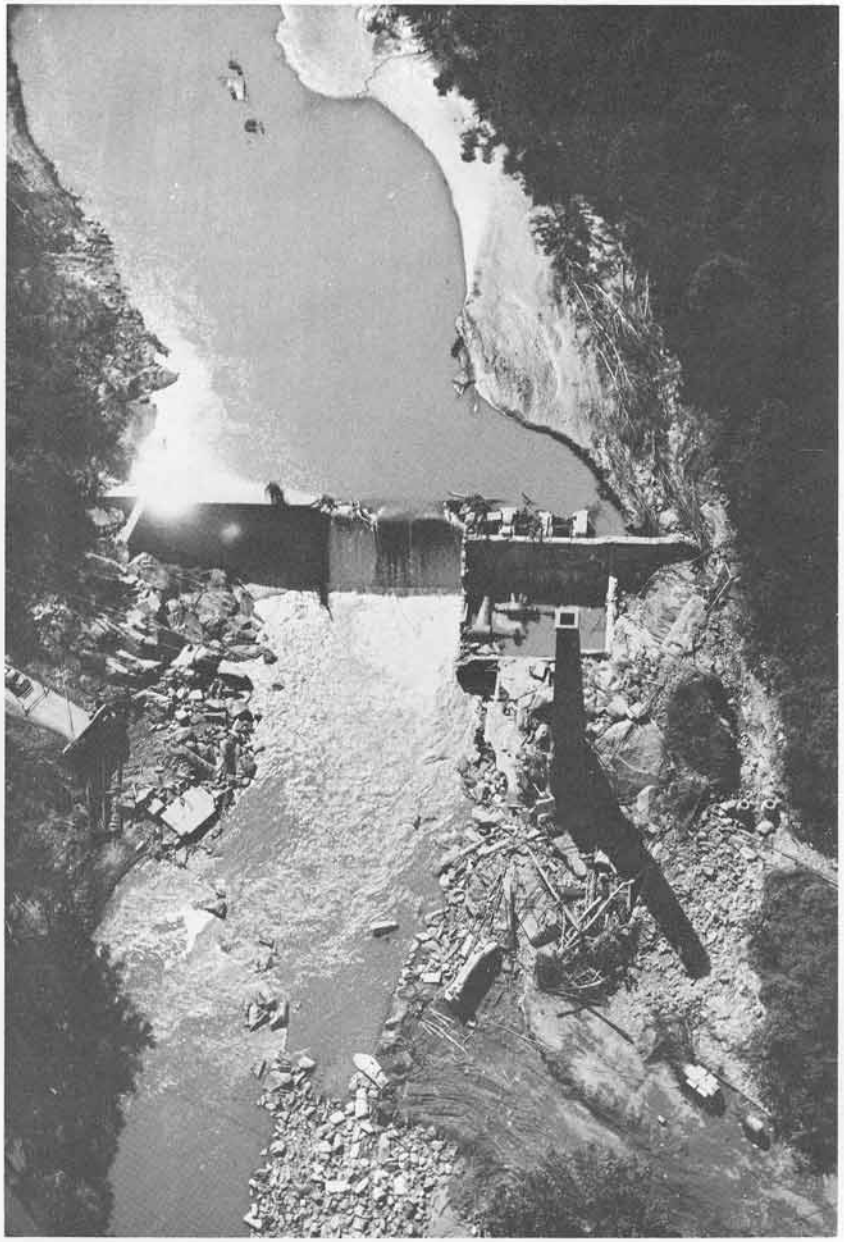
18 Constriction of debris veneer (center) and its truncation by Dillard (Hargrove) Creek in Stevens Cove. About 1.6 miles west-southwest of Lovingston.

19 Toe of debris cone truncated by Muddy Creek; destruction of U. S. Highway 29. About 5.7 miles north of Lovingston.

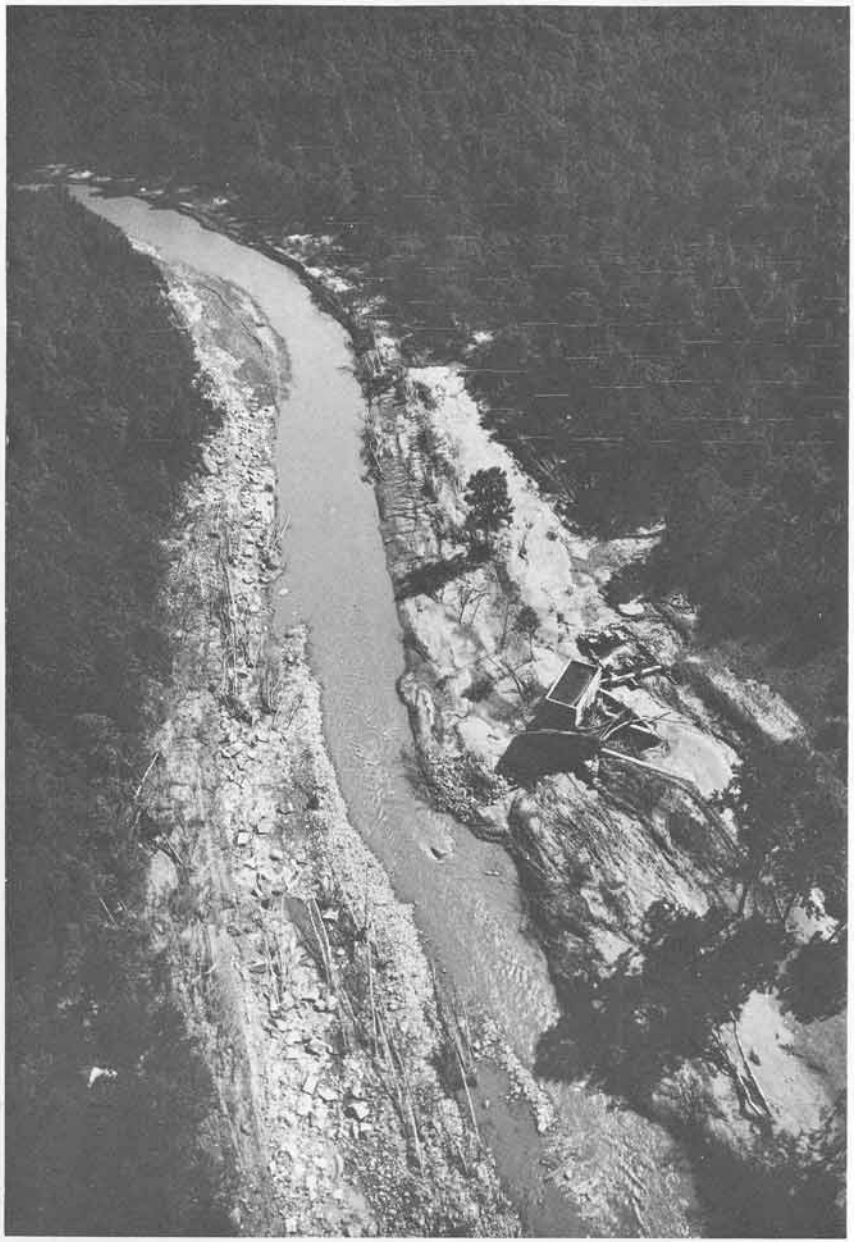
20 Large quantities of sand and silt and jumbled piles of trees deposited at the confluence of Rockfish River and Muddy Creek. The channel of Muddy Creek (background) has cut into the silt deposit. Looking southward along U. S. Highway 29 at Woods Mill; State Highway 6 at lower right.



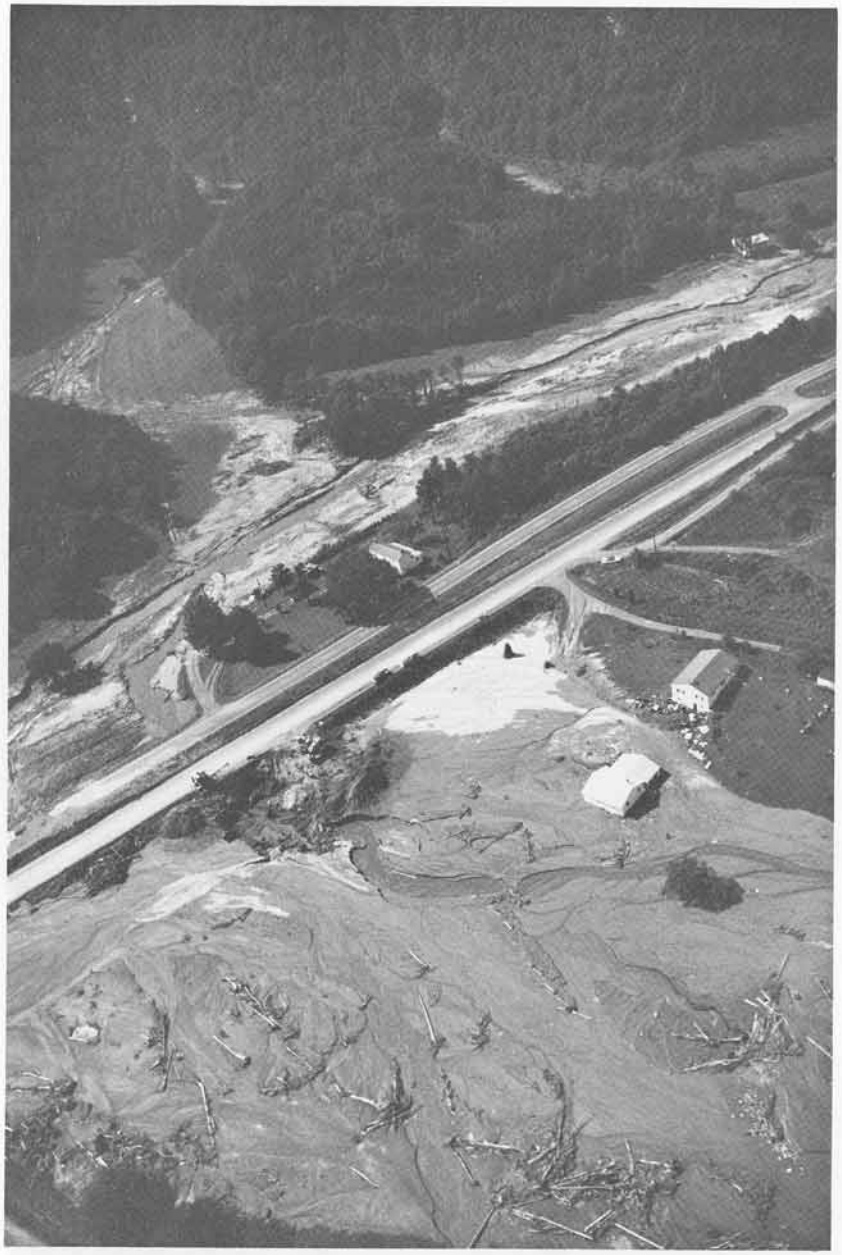
21 Chaotic deposit of boulders and tree trunks through which water of Davis Creek has begun initial entrenchment. In the headwaters of Davis Creek, about 5.5 miles southwest of Woods Mill.



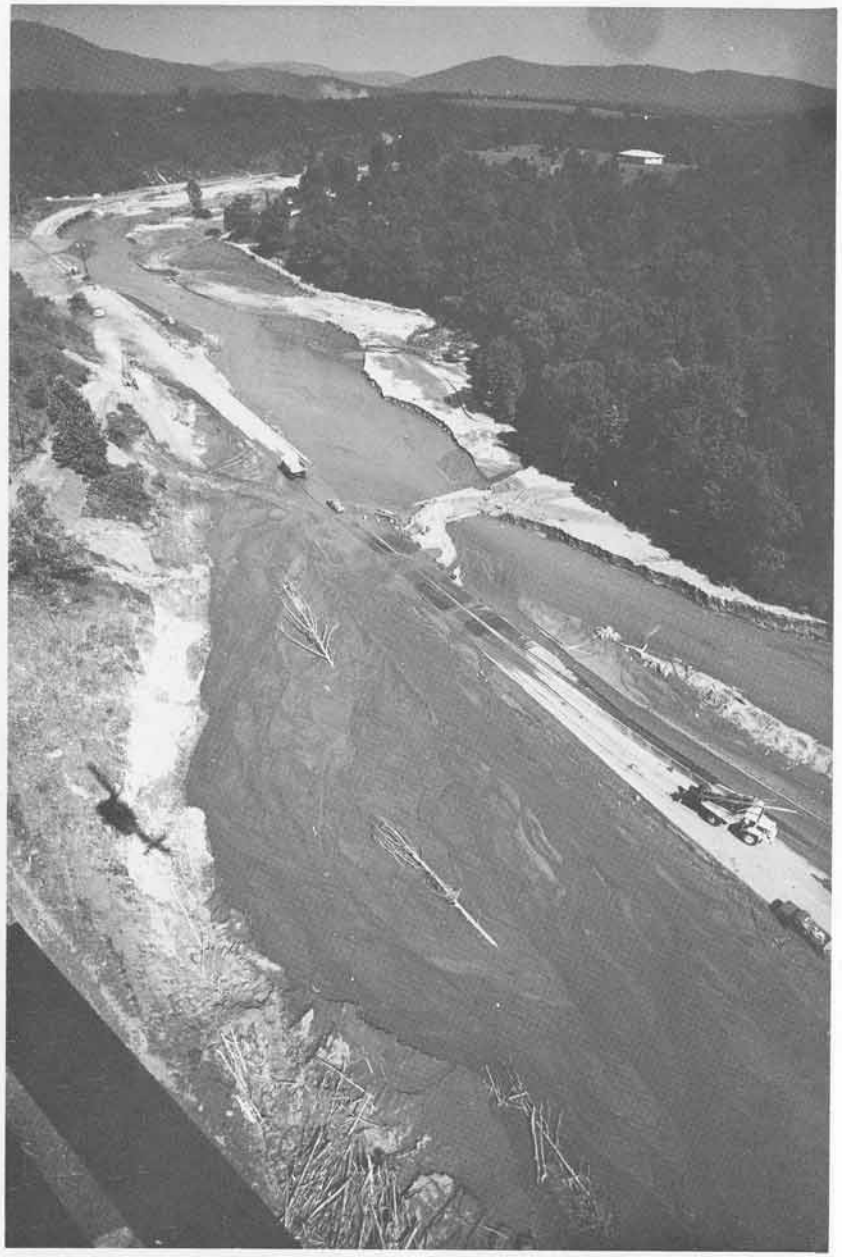
22 Devastated power plant of Alberene Stone, A Division of the Georgia Marble Co.; only generator and stack remain; bridge span of State Road 693 just south of dam was obliterated. Schuyler.



23 Remains of filtration plant on right bank of Rockfish River; tree trunks aligned with flow direction of flood water; graded rubble deposited along foot of cut-in bank. About 1 mile west of Schuyler.

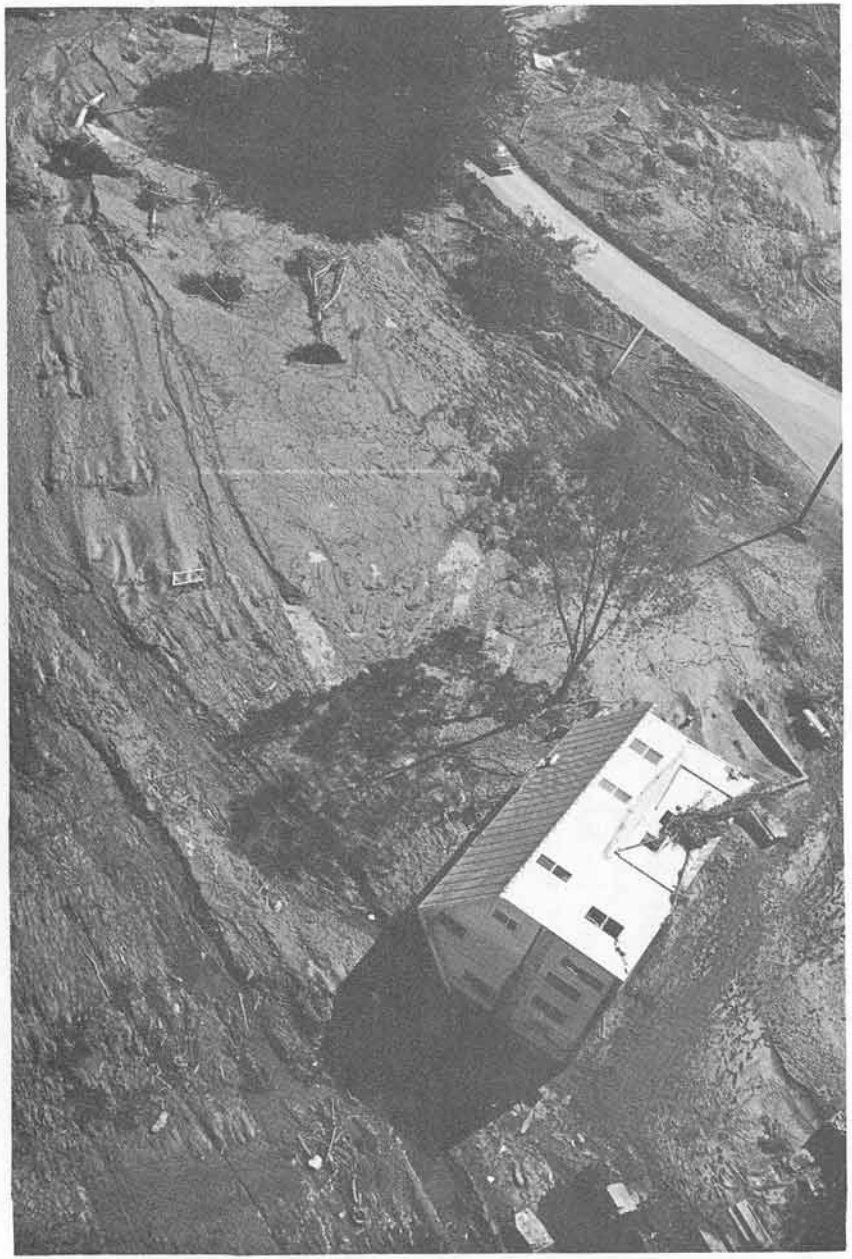


24 Mudflow impeded by fill of U. S. Highway 29; surface of flow is covered with an anastomosing pattern left by braided streams and rivulets. House (center right) is partially buried in flow. Looking northwest at confluence of tributary from Melton Hollow with Muddy Creek, about 1.5 miles north of Lovingston.

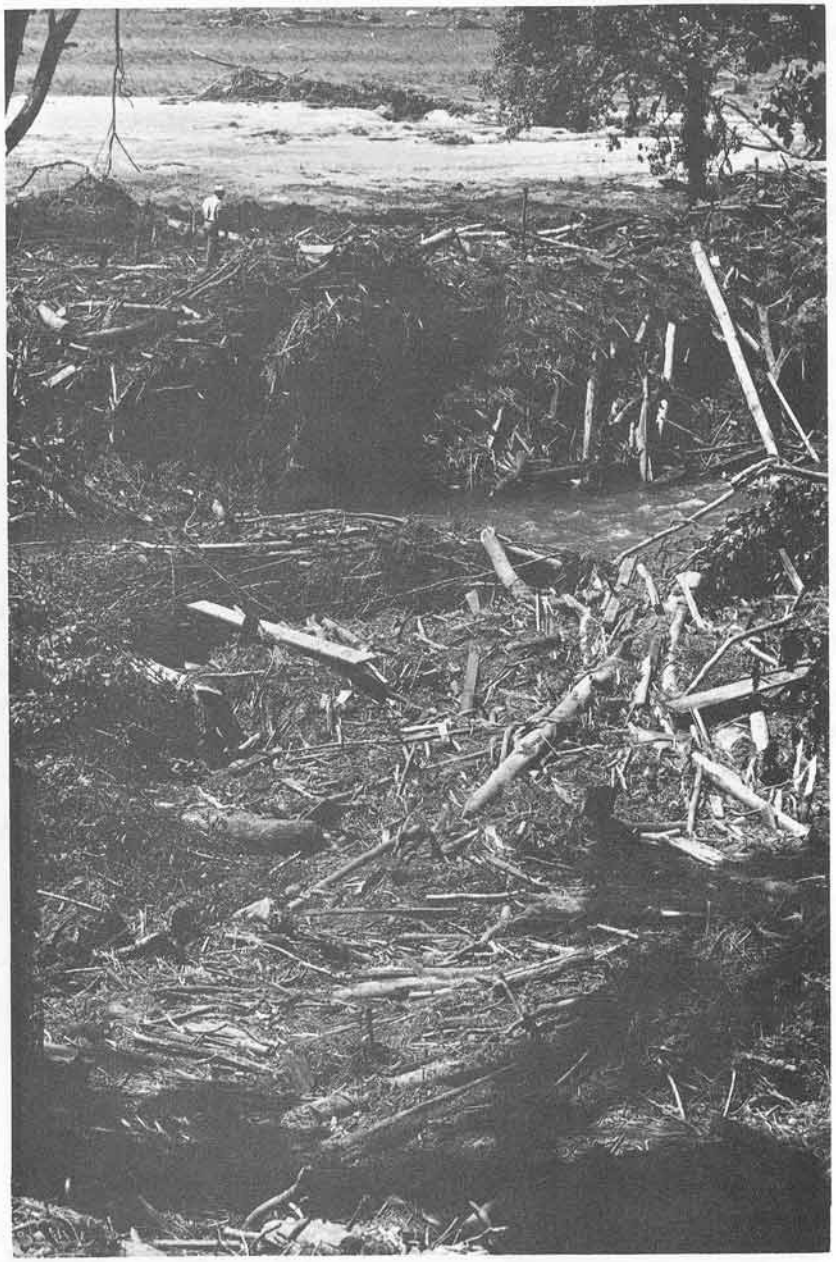


25 Siltation and channel scour adjacent to U. S. Highway 29. Just below confluence of Muddy and Davis creeks, about 0.5 mile southwest of Woods Mill.

26 Bridge sections torn loose from abutments; tree trunks are aligned parallel to stream flow; channel cut into flood debris (background). About 0.4 mile southeast of Rockfish at the State Road 617—Rockfish River crossing.



27 Residence lifted from its original position (part of foundation wall and pillar visible) and turned on its side; probable high-water mark on side (foreground). Roseland.

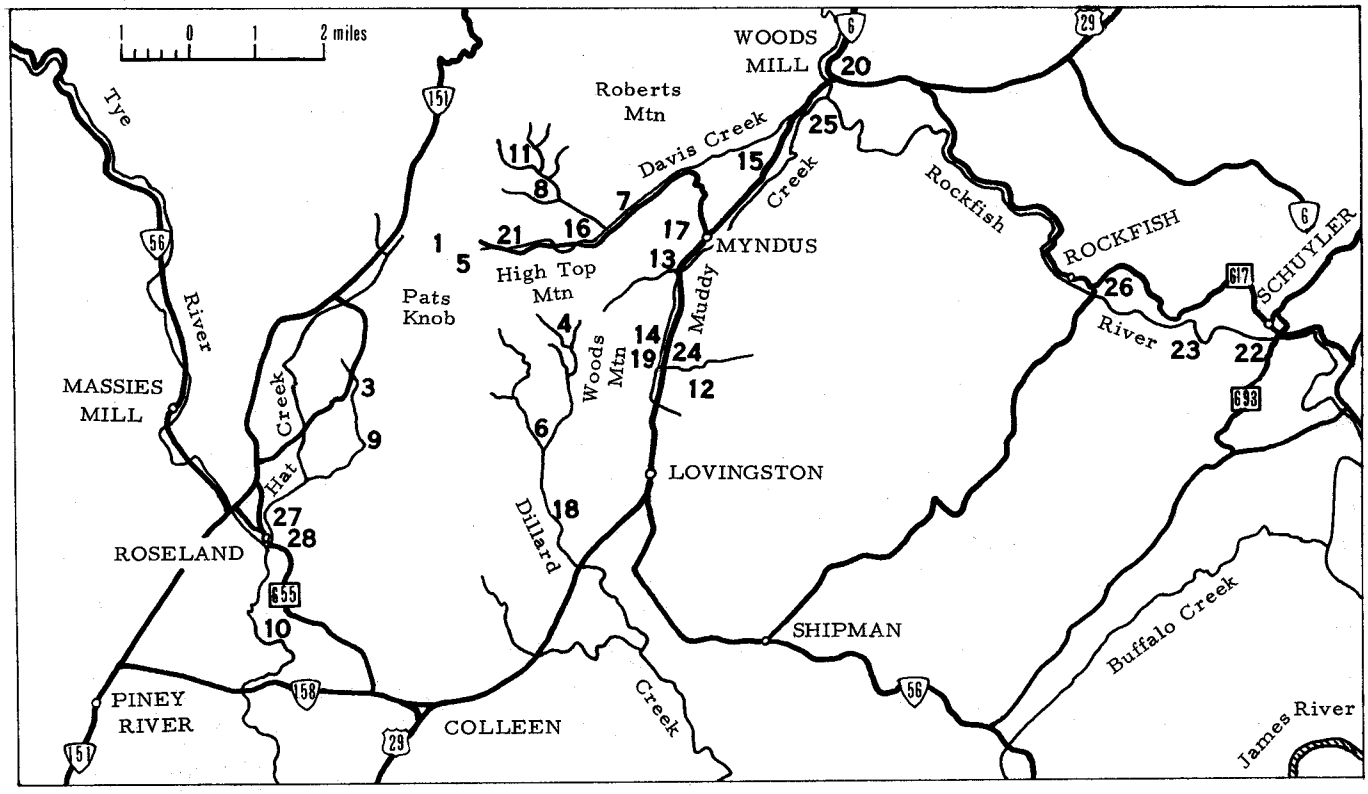


28 Jumbled mat of tree trunks and limbs deposited along tributary to Tye River. Location just south of area in illustration 27, Roseland.

Virginia Division of Mineral Resources
Box 3667
Charlottesville, VA 22903

Second-class postage paid at
Charlottesville, Virginia.

Return Postage Guaranteed



Sketch map of locations where photographs of the August 1969 flood in Nelson County were taken.